

AMENDMENTS TO THE CLAIMS

In the Claims

1. (Currently Amended) A method of obtaining an image signal using a CMOS sensor with a freeze-frame shutter comprising:

collecting a short image signal during a first time period;

sampling the short image signal after the first time period;

collecting a long image signal during a second time period;

sampling the long image signal after the second time period; and

combining the short image signal and the long image signal in an analog memory in the sensor to create a total image signal.

2. (Original) The method of Claim 1, wherein the second time period includes the first time period.

3. (Original) The method of Claim 1, further comprising resetting a photodetector prior to collecting the short image signal.

4. (Currently Amended) The method of Claim 1, further comprising resetting [[a]] the analog memory containing the total image signal prior to collecting the short image signal.

5. (Original) The method of Claim 1, further comprising simultaneous sampling of the short image signal while collecting the long image signal.

6. (Currently Amended) The method of Claim 1, further comprising reading the total image signal from the ~~freeze-frame pixel~~ CMOS sensor.

7. (Original) The method of Claim 6, wherein the short image signals and the long image signals are not collected during the reading of the total image signal.

8. (Currently Amended) A freeze-frame pixel using wide dynamic range operating comprising:

a photodetector having a memory;

an analog memory; and

a plurality of switches ~~which connect the photodetector to the analog memory, wherein a first switch allows collection of a first image signal by the photodetector, a second switch allows transfer of the first image signal from the photodetector memory to the analog memory while the photodetector continues to collect a second image signal, and the second switch then allowing transfer of the second image signal to the analog memory~~ including:

a first switch constructed to connect the photodetector to a reset voltage source;

a second switch constructed to connect the photodetector to the analog memory for permitting transfer of a first and a second image signal collected in the photodetector during a respective first and second collection time period; and

a third switch for connecting the analog memory to a reset voltage source, wherein the third switch is different than either the first or the second switch.

9. (Currently Amended) The freeze-frame pixel of Claim 8, wherein ~~the first image signal is collected during a first time period and the second image signal is collected during a second time period,~~ the second time period ~~being~~ is longer than the first time period.

10. (Original) The freeze-frame pixel of Claim 9, wherein the second time period includes the first time period.

Claims 11-12 (Canceled)

13. (Currently Amended) The freeze-frame pixel of Claim 8, wherein the analog memory ~~combines~~ is constructed such that it is able to combine the first image signal and the second image signal to create a total image signal.

14. (Original) The freeze-frame pixel of Claim 13, further comprising a readout section to transfer the total image signal.

Claim 15 (Canceled)

16. (New) A method of operating a CMOS image sensor comprising:

resetting an analog memory of the image sensor by activating a first switch;

resetting a photodetector of the image sensor by activating a second switch;

integrating charge at the photodetector during a first integration period to generate a first image signal;

transferring the first image signal from the photodetector to the memory by activating a third switch;

integrating charge at the photodetector during a second integration period to generate a second image signal; and

transferring the second image signal from the photodetector to the memory by activating the third switch.

17. (New) The method of claim 16, further comprising creating a total image signal by combining the first and the second image signals.

18. (New) The method of claim 16, further comprising reading out the total image signal through a readout circuit.

19. (New) An array of image sensor cells comprising:

a plurality of pixels arranged in an array and comprising:

a photodetector having a memory;

an analog memory; and

a plurality of switches including:

a first switch constructed to connect the photodetector to a reset voltage source;

a second switch constructed to connect the photodetector to the analog memory for permitting transfer of a first and a second image signal collected in the photodetector during a respective first and second collection time period; and

a third switch for connecting the analog memory to a reset voltage source, wherein the third switch is different than either the first or the second switch.

20. (New) The array of claim 19, wherein the first and the second collection time periods are identical for each of the plurality of pixels.

21. (New) The array of claim 20, wherein the second collection time period includes the first collection time period.

22. (New) The array of claim 19, wherein the plurality of pixels are arranged in rows and columns in said array, the array further comprising a column readout circuit constructed to read out a total image signal from each of the plurality of pixels, one row at a time.

23. (New) The array of claim 19, wherein the analog memory is constructed such that it can create a total image signal based on the first and the second image signals.